

4793

**RENEWAL OF PERMITS TO OPERATE AT THE
FERNALD ENVIRONMENTAL MANAGEMENT
PROJECT OEPA ID NOS. 1431110128 T028, T029,
T030, T031, T032, T033 AND T034**

10/07/93

**C:RP:93-0164
FERMCO/OEPA
36
PERMIT AP**



Restoration Management Corporation P.O. Box 398704 Cincinnati, Ohio 45239-8704 (513) 738-6200

October 7, 1993

U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C:RP:93-0164

Mr. Peter Sturdevant
Compliance Specialist
Hamilton County Department
of Environmental Services
Air Quality Management Division
1632 Central Parkway
Cincinnati, Ohio 45210

Dear Mr. Sturdevant:

**RENEWAL OF PERMITS TO OPERATE AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
OEPA ID. NOS. 1431110128 T028, T029, T030, T031, T032, T033, AND T034**

Enclosed please find the renewal applications for seven FEMP storage tanks for which the Permits to Operate are scheduled to expire in December 1993. A check for \$105.00 is enclosed to cover the application fees.

Please contact Kip Klee of my staff at 738-8640 if you have any questions about these applications.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kenneth L. Alkema".

Kenneth L. Alkema
Vice President
Regulatory Programs

KLA:KOK:mhv
Attachments

cc: S. M. Beckman, FERMCO - w/o attachments
R. W. Bischoff, FERMCO - w/o attachments
Robert Mendelsohn, DOE Contract Specialist
P. B. Spotts, FERMCO - w/o attachments
W. J. Quaid, DOE- FN
AR Coordinator
PR Files (PTOs T028-T034) - w/o attachments
File Record Storage Copy 108.6

0001

4793

**OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE**

D.O.E.-Fernald Environmental Management
Facility Name Project

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T028
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing Facility
☐ Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
☐ Appendix K, Surface Coating Line or Printing Line

☐ Appendix L, Solvent Metal Cleaning
☐ Appendix M, Fugitive Dust Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire Manufacturing
☐ Appendix O, Dry Cleaning Facility
☐ Appendix P, Landfills
☐ Other Appendix _____
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): UNH Storage Tank F2E-10
3. Your identification for Source (same as used on appendix):
Plant 2/3 UNH Storage Tank F2E-10, FEMP Id. # 2-017

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate

Kenneth L. Alkema
Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

Oct 93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0002

Premise No. ____/____/____/____
Source No. ____/____/____
Application No. ____/____

DOE - FEMP
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number UNH Storage Tank F2E-10 Date Installed 1952
(FEMP Id. # 2-017) (month/year)
2. Tank capacity: 2,500 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 6 ft. Height 12 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ Pressure tank
☐ Other, specify _____
7. Location of tank: ☐ Outdoors ☒ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☐ Other, specify _____
Condition of paint: ☐ Good ☐ Poor
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
N/A
 - a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted.)

4793

DOE - FEMP
 (Facility Name)
 F2E-10 (2-017)
 (tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve.
 N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to vapor control, identify the vapor control
_____	_____	_____	_____
_____	_____	_____	_____

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name UNH
 Density: 9.0 lbs/gal or ---- ° API Producer FERMCO

b) Temperature of stored material: Average AMB °F and Maximum AMB °F
 (If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
0.29 psia at maximum storage temperature

ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn - --- psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? ☐ yes ☒ No

If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 100,000 gallons.

Completed by Kip Klee Date 09-16-93

810004

Storage Tank Emission Report
Monday, September 13, 1993

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

- (1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.
- (2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.
- (3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.
- (4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.
- (5) Vapor losses from the tank are calculated using the TANKS software program, version 1.1.
- (6) Maximum emissions are five times the calculated annual emissions.

---- Tank Characteristics ----

Identification

Identification No.:	T028	City:	Dayton
State:	Ohio	Company:	DOE-FEMP

Input Parameters

Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	12	Diameter (ft):	6
Liquid Height (ft):	12	Volume (gallons):	2538
Turnovers:	40	Net Throughput (gal/yr):	100000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular	Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None

Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Root Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	100000
Liquid Volume (cubic feet) =	339
Turnovers =	39
Turnover Factor =	0.9282
Working Loss Product Factor =	1.00
Total Working Losses =	9.04

---- Storage Tank Total Losses (AP-42) ----

Total losses = 9.04

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{9.04 \text{ lb water}}{\text{year}} \times \frac{6 \times 10^{-6} \text{ lb U}}{1000 \text{ lb water}} = 5.42 \text{ E-08 lb U/year}$

Maximum Emissions: $5.42 \text{ E-08 lb U/year} \times 5 = 2.71 \text{ E-07 lb U/year}$

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4793

D.O.E.-Fernald Environmental Management
Facility Name Project

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T029
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing Facility
☐ Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
☐ Appendix K, Surface Coating Line or Printing Line

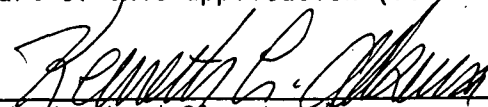
☐ Appendix L, Solvent Metal Cleaning
☐ Appendix M, Fugitive Dust Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire Manufacturing
☐ Appendix O, Dry Cleaning Facility
☐ Appendix P, Landfills
☐ Other Appendix _____
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): UNH Storage Tank F2E-6
3. Your identification for Source (same as used on appendix):
Plant 2/3 UNH Storage Tank F2E-6, FEMP Id. # 2-026

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate


Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

06 Oct 93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0007

FOR OFFICIAL USE ONLY

Premise No. ____/____/____/____
Source No. ____/____/____
Application No. ____/____

DOE - FEMP
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number UNH Storage Tank F2E-6 Date Installed 1952
(FEMP Id. # 2-026) (month/yea
2. Tank capacity: 25,265 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 16.5 ft. Height 16 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ pressure tank
☐ Other, specify _____
7. Location of tank: ☒ Outdoors ☐ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A Tank is stainless steel, not painted
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☐ Other, specify _____
Condition of paint: ☐ Good ☐ Poor
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
N/A
 - a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted.

1. Complete the table below for any pressure or vacuum relief vent valve.
N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name UNH
Density: 9.0 lbs/gal or ---- ° API Producer FERMCO

b) Temperature of stored material: Average AMB °F and Maximum AMB °F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
0.29 psia at maximum storage temperature

ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn - --- psi

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? ☐ yes ☒ No

If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 150,000 gallons.

Completed by Kip Klee Date 09-16-93

Storage Tank Emission Report
Monday, September 13, 1993

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

- (1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.
- (2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.
- (3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.
- (4) The emission factor has been determined to be 6×10^{-6} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.
- (5) Vapor losses from the tank are calculated using the TANKS software program, version 1.1.
- (6) Maximum emissions are five times the calculated annual emissions.

---- Tank Characteristics ----

Identification

Identification No.:	T029	City:	Dayton
State:	Ohio	Company:	DOE_FEMP

Input Parameters

Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	16	Diameter (ft):	17
Liquid Height (ft):	3	Volume (gallons):	5094
Turnovers:	29	Net Throughput (gal/yr):	150000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular	Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None

Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	13.00
Vapor Space Volume =	2950.74
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	0.864628
Total Standing Losses =	30.90

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	150000
Liquid Volume (cubic feet) =	681
Turnovers =	29
Turnover Factor =	1.0000
Working Loss Product Factor =	1.00
Total Working Losses =	14.61

---- Storage Tank Total Losses (AP-42) ----

Total losses = 45.51

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{45.51 \text{ lb water}}{\text{year}} \times \frac{6 \times 10^{-6} \text{ lb U}}{1000 \text{ lb water}} = 2.73 \text{ E-07 lb U/year}$

Maximum Emissions: $2.73 \text{ E-07 lb U/year} \times 5 = 1.37 \text{ E-06 lb U/year}$

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4793
D.O.E.-Fernald Environmental Management
Facility Name Project

7400 Willey Road
Facility Address

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City County Zip

513/ 738-6502
Telephone Area Number

#1431110128-T030
(Application no., if this is a renewal application)

Mr. Stephen M. Beckman
Person to Contact

Post Office Box 398704
Mailing Address

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or
Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing
Facility
☐ Appendix J, Loading Rack at Bulk
Gasoline Plant or
Terminal
☐ Appendix K, Surface Coating
Line or Printing Line

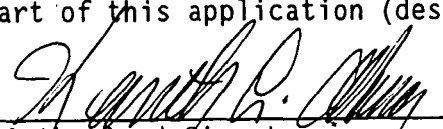
☐ Appendix L, Solvent Metal
Cleaning
☐ Appendix M, Fugitive Dust
Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire
Manufacturing
☐ Appendix O, Dry Cleaning
Facility
☐ Appendix P, Landfills
☐ Other Appendix
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): UNH Storage Tank F2E-7
3. Your identification for Source (same as used on appendix):
Plant 2/3 UNH Storage Tank F2E-7, FEMP Id. # 2-027

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate


Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

Oct 93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

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FOR OFFICIAL USE ONLY

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Premise No. ____/____/____/____
Source No. ____/____/____
Application No. ____/____

DOE - FEMP
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number UNH Storage Tank F2E-7 Date Installed 1952
(FEMP Id. # 2-027) (month/year)
2. Tank capacity: 25,265 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 16.5 ft. Height 16 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ Pressure tank
☒ Other, specify Tank is insulated
7. Location of tank: ☒ Outdoors ☐ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☒ Other, specify Black
Condition of paint: ☒ Good ☐ Poor Insulation covering is painted.
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
N/A
 - a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted.)

0013

4793

DOE - FEMP
(Facility Name)
F2E-7 (2-027)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve.

N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to vapor control, identify the vapor contr

12. Operational Data (complete (a) through (g) of this item for all materials stored or to stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name UNH
Density: 10.8 lbs/gal or ---- ° API Producer FERMCO

b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor press is not known, write "unknown"):

i.) Actual vapor pressure: 0.28 psia at average storage temperatur
0.41 psia at maximum storage temperatur

ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn - ---

iii.) If material stored is a gas or liquified gas, provide the pressure at which is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? ☐ yes ☒ No

If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 150,000 gallons.

Completed by Kip Klee Date 09-16-93

3014

Storage Tank Emission Report
Monday, September 13, 1993

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

- (1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.
- (2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.
- (3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.
- (4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.
- (5) Vapor losses from the tank are calculated using the TANKS software program, version 1.1.
- (6) Maximum emissions are five times the calculated annual emissions.

---- Tank Characteristics ----

Identification

Identification No.:	T030	City:	Dayton
State:	Ohio	Company:	DOE-FEMP

Input Parameters

Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	16	Diameter (ft):	17
Liquid Height (ft):	3	Volume (gallons):	5094
Turnovers:	29	Net Throughput (gal/yr):	150000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Red/Primer	Shell Condition:	Good
Roof Color/Shade:	Red/Primer	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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---- Storage Tank Contents Temperature Data ----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.89
Alpha (Roof) =	0.89
Liquid Bulk Temperature (Degrees Fahrenheit) =	56.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	62.49
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	73.17
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	51.81
Daily Vapor Temperature Range =	42.73

---- Storage Tank Vapor Pressure Information ----

Speciation Option: None

Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.283469
Minimum Vapor Pressure of total mixture =	0.192377
Maximum Vapor Pressure of total mixture =	0.409037
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.216660

---- Storage Tank Standing Loss Information (AP-42) ----

Roof Outage =	0.00
Vapor Space Outage =	13.00
Vapor Space Volume =	2950.74
Vapor Density =	0.0009
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.051799
Vented Vapor Saturation Factor =	0.836603
Total Standing Losses =	42.50

---- Storage Tank Working Loss Information (AP-42) ----

Net Throughput (gal/year) =	150000
Liquid Volume (cubic feet) =	681
Turnovers =	29
Turnover Factor =	1.0000
Working Loss Product Factor =	1.00
Total Working Losses =	18.22

---- Storage Tank Total Losses (AP-42) ----

Total losses = 60.72

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{60.72 \text{ lb water}}{\text{year}} \times \frac{6 \times 10^{-6} \text{ lb U}}{1000 \text{ lb water}} = 3.64 \text{ E-07 lb U/year}$

Maximum Emissions: $3.64 \text{ E-07 lb U/year} \times 5 = 1.82 \text{ E-06 lb U/year}$

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4793

D.O.E.-Fernald Environmental Management
Facility Name Project

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T031
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing Facility
☐ Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
☐ Appendix K, Surface Coating Line or Printing Line

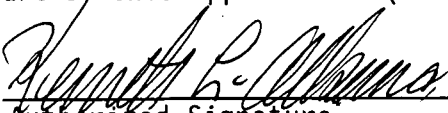
☐ Appendix L, Solvent Metal Cleaning
☐ Appendix M, Fugitive Dust Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire Manufacturing
☐ Appendix O, Dry Cleaning Facility
☐ Appendix P, Landfills
☐ Other Appendix _____
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): UNH Storage Tank F2E-5
3. Your identification for Source (same as used on appendix):
Plant 2/3 UNH Storage Tank F2E-5, FEMP Id. # 2-028

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate


Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

8 Oct 93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161 0017

Premise No. ____/____/____/____
Source No. ____/____
Application No. ____/____

DOE - FEMP
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number UNH Storage Tank F2E-5 Date Installed 1952
(FEMP Id. # 2-028) (month/year)
2. Tank capacity: 25,265 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 16.5 ft. Height 16 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ Pressure tank
☐ Other, specify _____
7. Location of tank: ☒ Outdoors ☐ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A Tank is stainless steel, not painted
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☐ Other, specify _____
Condition of paint: ☐ Good ☐ Poor
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
N/A
 - a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

1. Complete the table below for any pressure or vacuum relief vent valve.
N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

2. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

- a) Material Uranyl Nitrate Trade Name UNH
Density: 23.3 lbs/gal or ---- ° API Producer FERMCO
- b) Temperature of stored material: Average AMB °F and Maximum AMB ° F
(If temperature is approximately outdoor ambient temperature, write "AMB".)
- c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):
 - i.) Actual vapor pressure: 0.23 psia at average storage temperature
0.29 psia at maximum storage temperature
 - ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn --- psi
 - iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)
 Is it a hazardous waste? ☐ yes ☒ No
 If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 150,000 gallons.

Completed by Kip Klee Date 09-16-93

4793

Storage Tank Emission Report
Monday, September 13, 1993

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

- (1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.
- (2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.
- (3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.
- (4) The emission factor has been determined to be 6×10^{-6} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.
- (5) Vapor losses from the tank are calculated using the TANKS software program, version 1.1.
- (6) Maximum emissions are five times the calculated annual emissions.

---- Tank Characteristics ----

Identification

Identification No.:	T031	City:	Dayton
State:	Ohio	Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof
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Tank Dimensions

Shell Height (ft):	16	Diameter (ft):	17
Liquid Height (ft):	3	Volume (gallons):	5094
Turnovers:	29	Net Throughput (gal/yr):	150000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular	Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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0020

----- Storage Tank Contents Temperature Data -----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

----- Storage Tank Vapor Pressure Information -----

Speciation Option: None

Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

----- Storage Tank Standing Loss Information (AP-42) -----

Roof Outage =	0.00
Vapor Space Outage =	13.00
Vapor Space Volume =	2950.74
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	0.864628
Total Standing Losses =	30.90

----- Storage Tank Working Loss Information (AP-42) -----

Net Throughput (gal/year) =	150000
Liquid Volume (cubic feet) =	681
Turnovers =	29
Turnover Factor =	1.0000
Working Loss Product Factor =	1.00
Total Working Losses =	14.61

----- Storage Tank Total Losses (AP-42) -----

Total losses = 45.51

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{45.51 \text{ lb water}}{\text{year}} \mid \frac{6 \times 10^{-06} \text{ lb U}}{1000 \text{ lb water}} \mid = 2.73 \text{ E-07 lb U/year}$

Maximum Emissions: $2.73 \text{ E-07 lb U/year} \times 5 = 1.37 \text{ E-06 lb U/year}$

4793

**OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE**

D.O.E.-Fernald Environmental Management
Facility Name Project

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T032
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing Facility
☐ Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
☐ Appendix K, Surface Coating Line or Printing Line

☐ Appendix L, Solvent Metal Cleaning
☐ Appendix M, Fugitive Dust Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire Manufacturing
☐ Appendix O, Dry Cleaning Facility
☐ Appendix P, Landfills
☐ Other Appendix _____
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): UNH Storage Tank F2E-8

3. Your identification for Source (same as used on appendix):
Plant 2/3 UNH Storage Tank F2E-8, FEMP Id. # 2-029

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate

Kenneth L. Alkema
Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

00 Oct 13
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

FOR OFFICIAL USE ONLY

Premise No. ____/____/____/____
 Source No. ____/____/____
 Application No. ____/____

4793

DOE - FEMP
 (Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number UNH Storage Tank F2E-8 Date Installed 1952
 (FEMP Id. # 2-029) (month/year)
2. Tank capacity: 25,265 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 16.5 ft. Height 16 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ Pressure tank
☒ Other, specify Tank is insulated
7. Location of tank: ☒ Outdoors ☐ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☒ Other, specify Black
 Condition of paint: ☒ Good ☐ Poor Insulation covering is painted.
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
 N/A
 - a) Type of vapor control system _____
 Manufacturer _____ Make or model _____
 Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
 (Attach calculations and test data to support response, unless previously submitted.)

4793

DOE - FEMP
 (Facility Name)
 F2E-8 (2-029)
 (tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve.
 N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to vapor control, identify the vapor control

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Uranyl Nitrate Trade Name UNH
 Density: 9.0 lbs/gal or ---- ° API Producer FERMCO

b) Temperature of stored material: Average AMB °F and Maximum AMB °F
 (If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.28 psia at average storage temperature
0.41 psia at maximum storage temperature

ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn - ---

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? ☐ yes ☒ No

If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 150,000 gallons.

Completed by Kip Klee Date 09-16-93

000-0024

4793

Storage Tank Emission Report
Monday, September 13, 1993

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

- (1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.
- (2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.
- (3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.
- (4) The emission factor has been determined to be 6×10^{-6} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.
- (5) Vapor losses from the tank are calculated using the TANKS software program, version 1.1.
- (6) Maximum emissions are five times the calculated annual emissions.

----- Tank Characteristics -----

Identification

Identification No.:	T032	City:	Dayton
State:	Ohio	Company:	DOE-FEMP

Input Parameters

Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	16	Diameter (ft):	17
Liquid Height (ft):	3	Volume (gallons):	5094
Turnovers:	29	Net Throughput (gal/yr):	150000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Red/Primer	Shell Condition:	Good
Roof Color/Shade:	Red/Primer	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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PSOL 0025

----- Storage Tank Contents Temperature Data -----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.89
Alpha (Roof) =	0.89
Liquid Bulk Temperature (Degrees Fahrenheit) =	56.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	62.49
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	73.17
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	51.81
Daily Vapor Temperature Range =	42.73

----- Storage Tank Vapor Pressure Information -----

Speciation Option: None

Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.283469
Minimum Vapor Pressure of total mixture =	0.192377
Maximum Vapor Pressure of total mixture =	0.409037
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.216660

----- Storage Tank Standing Loss Information (AP-42) -----

Roof Outage =	0.00
Vapor Space Outage =	13.00
Vapor Space Volume =	2950.74
Vapor Density =	0.0009
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.051799
Vented Vapor Saturation Factor =	0.836603
Total Standing Losses =	42.50

----- Storage Tank Working Loss Information (AP-42) -----

Net Throughput (gal/year) =	150000
Liquid Volume (cubic feet) =	681
Turnovers =	29
Turnover Factor =	1.0000
Working Loss Product Factor =	1.00
Total Working Losses =	18.22

----- Storage Tank Total Losses (AP-42) -----

Total losses = 60.72

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{60.72 \text{ lb water}}{\text{year}} \times \frac{6 \times 10^{-6} \text{ lb U}}{1000 \text{ lb water}} = 3.64 \text{ E-07 lb U/year}$

Maximum Emissions: $3.64 \text{ E-07 lb U/year} \times 5 = 1.82 \text{ E-06 lb U/year}$

OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE

4793

D.O.E.-Fernald Environmental Management
Facility Name Project

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T033
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or
Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing
Facility
☐ Appendix J, Loading Rack at Bulk
Gasoline Plant or
Terminal
☐ Appendix K, Surface Coating
Line or Printing Line

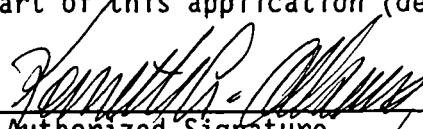
☐ Appendix L, Solvent Metal
Cleaning
☐ Appendix M, Fugitive Dust
Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire
Manufacturing
☐ Appendix O, Dry Cleaning
Facility
☐ Appendix P, Landfills
☐ Other Appendix _____
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): Storage Tank F1-25A
3. Your identification for Source (same as used on appendix):
Plant 2/3 Slopwater Storage Tank F1-25A, FEMP Id. #2-030

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate


Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

B Oct 93
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1

EPA-3161

0027

4793

FOR OFFICIAL USE ONLY

Premise No. ____/____/____/____

Source No. ____/____/____

Application No. ____/____/____

DOE - FEMP
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number Slopwater St. tank F1-25A Date Installed 1952
(FEMP Id. # 2-030) (month/year)
2. Tank capacity: 14,203 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 13.25 ft. Height 14 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ Pressure tank
☐ Other, specify _____
7. Location of tank: ☒ Outdoors ☐ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
N/A Tank is stainless steel, not painted
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☐ Other, specify _____
Condition of paint: ☐ Good ☐ Poor
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
N/A
 - a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted.

0028

11. Complete the table below for any pressure or vacuum relief vent valve.
 N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

- a) Material Slopwater, Rainwater, process water Trade Name ----
 Density: 8.3 lbs/gal or ---- ° API Producer FERMCO
- b) Temperature of stored material: Average AMB °F and Maximum AMB °F
 (If temperature is approximately outdoor ambient temperature, write "AMB".)
- c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):
- i.) Actual vapor pressure: 0.23 psia at average storage temperature
0.29 psia at maximum storage temperature
- ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn - --- psi
- iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? ☐ yes ☒ No

If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 2,500,000 gallons.

Completed by Kip Klee Date 09-16-93

Storage Tank Emission Report

Monday, September 13, 1993

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

- (1) At typical tank pressures and temperatures, the vapor pressure of the Slopwater solution is essentially that of water.
- (2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.
- (3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.
- (4) The emission factor has been determined to be 6×10^{-6} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.
- (5) Vapor losses from the tank are calculated using the TANKS software program, version 1.1.
- (6) Maximum emissions are five times the calculated annual emissions.

---- Tank Characteristics ----

Identification

Identification No.:	T033	City:	Dayton
State:	Ohio	Company:	DOE-FEMP

Input Parameters

Type of Tank:	Vertical Fixed Roof
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Tank Dimensions

Shell Height (ft):	15	Diameter (ft):	13
Liquid Height (ft):	15	Volume (gallons):	14895
Turnovers:	168	Net Throughput (gal/yr):	2500000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular	Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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----- Storage Tank Contents Temperature Data -----

Daily Average Ambient Temperature (Degrees Fahrenheit) =	51.90
Daily Minimum Ambient Temperature (Degrees Fahrenheit) =	42.30
Daily Maximum Ambient Temperature (Degrees Fahrenheit) =	61.50
Daily Ambient Temperature Range =	19.20
Solar Insolation Factor =	1160.00
Alpha (Shell) =	0.39
Alpha (Roof) =	0.39
Liquid Bulk Temperature (Degrees Fahrenheit) =	53.24
Average Liquid Surface Temperature (Degrees Fahrenheit) =	56.22
Daily Maximum Liquid Surface Temperature (Degrees Fahrenheit) =	62.84
Daily Minimum Liquid Surface Temperature (Degrees Fahrenheit) =	49.60
Daily Vapor Temperature Range =	26.49

----- Storage Tank Vapor Pressure Information -----

Speciation Option: None

Chemical Liquid: Uranyl Nitrate

Vapor Pressure of total mixture =	0.227238
Minimum Vapor Pressure of total mixture =	0.175816
Maximum Vapor Pressure of total mixture =	0.287205
Vapor Molecular Weight of Mixture =	18.000000
Vapor pressure range =	0.111389

----- Storage Tank Standing Loss Information (AP-42) -----

Roof Outage =	0.00
Vapor Space Outage =	0.00
Vapor Space Volume =	0.00
Vapor Density =	0.0007
Breather Vent Range =	0.000000
Vapor Space Expansion Factor =	0.044914
Vented Vapor Saturation Factor =	1.000000
Total Standing Losses =	0.00

----- Storage Tank Working Loss Information (AP-42) -----

Net Throughput (gal/year) =	2500000
Liquid Volume (cubic feet) =	1991
Turnovers =	168
Turnover Factor =	0.3454
Working Loss Product Factor =	1.00
Total Working Losses =	84.10

----- Storage Tank Total Losses (AP-42) -----

Total losses = 84.10

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: $\frac{84.10 \text{ lb water}}{\text{year}} \times \frac{6 \times 10^{-6} \text{ lb U}}{1000 \text{ lb water}} = 5.05 \text{ E-06 lb U/year}$

Maximum Emissions: $5.05 \text{ E-06 lb U/year} \times 5 = 2.52 \text{ E-05 lb U/year}$

4793

**OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE
AN AIR CONTAMINANT SOURCE**

D.O.E.-Fernald Environmental Management
Facility Name Project

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398704
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T034
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

☐ Appendix A, Process
☐ Appendix B, Fuel-Burning Equipment
☐ Appendix C, Incinerator
☐ Appendix D, Surface Coating or Printing Operation
☒ Appendix E, Storage Tank
☐ Appendix H, Gasoline Dispensing Facility
☐ Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
☐ Appendix K, Surface Coating Line or Printing Line

☐ Appendix L, Solvent Metal Cleaning
☐ Appendix M, Fugitive Dust Emission Sources

Specify Appendix No.
☐ Appendix N, Rubber Tire Manufacturing
☐ Appendix O, Dry Cleaning Facility
☐ Appendix P, Landfills
☐ Other Appendix _____
☐ Compliance Time Schedule

2. Description of Source (same as used on appendix): Storage Tank F1-26A
3. Your identification for Source (same as used on appendix):
Plant 2/3 Slopwater Storage Tank F1-26A, FEMP Id. #2-031

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

- (1) Appendix E-2
(2) Emissions Estimate

Kenneth L. Alkema
Authorized Signature
Kenneth L. Alkema
Vice President Regulatory Programs
Title

00493
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code. Page 1 EPA-3161

0032

FOR OFFICIAL USE ONLY

Premise No. ____/____/____/____
 Source No. ____/____/____
 Application No. ____/____

DOE - FEMP
 (Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR
STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number Slopwater St. tank F1-26A Date Installed 1952
 (FEMP Id. # 2-031) (month/year)
2. Tank capacity: 14,203 gallons
3. Tank shape: ☒ Cylindrical ☐ Rectangular
☐ Spherical ☐ Other, specify _____
4. Tank dimensions: Diameter 13.25 ft. Height 14 ft. Length ----- Width -----
5. Tank shell material: ☐ Steel ☐ Aluminum ☒ Other, specify Stainless Steel
6. Type of tank: ☐ External floating roof tank
☐ Internal floating roof tank
☒ Fixed roof tank
☐ Vertical cylindrical tank
☐ Horizontal cylindrical tank
☐ Pressure tank
☐ Other, specify _____
7. Location of tank: ☒ Outdoors ☐ Indoors ☐ Underground
8. Type of filling: ☒ Splash ☐ Submerged ☐ Other, specify _____
9. If this tank is located outdoors and above ground, provide the paint color of the tank.
 N/A Tank is stainless steel, not painted
☐ Aluminum (specular) ☐ Light gray ☐ White
☐ Aluminum (diffuse) ☐ Medium gray ☐ Other, specify _____
 Condition of paint: ☐ Good ☐ Poor
10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.
 N/A
 - a) Type of vapor control system _____
 Manufacturer _____ Make or model _____
 Date installed (month and year) _____
 - b) Date tank was equipped with or vented to vapor control system (month & year) _____
 - c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
 (Attach calculations and test data to support response, unless previously submitted.)

4793

DOE - FEMP
(Facility Name)
F1-26A (2-031)
(tank identification)

11. Complete the table below for any pressure or vacuum relief vent valve.
N/A

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to vapor control, identify the vapor control

12. Operational Data (complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets if necessary.)

a) Material Slopwater, Rainwater, process water Trade Name ----
Density: 8.3 lbs/gal or ---- ° API Producer FERMCO

b) Temperature of stored material: Average AMB °F and Maximum AMB °F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii, iii of this item. If vapor pressure is not known, write "unknown"):

i.) Actual vapor pressure: 0.23 psia at average storage temperature
0.29 psia at maximum storage temperature

ii.) Reid vapor pressure: Average unkn psi and minimum-maximum unkn - ---

iii.) If material stored is a gas or liquified gas, provide the pressure at which it is stored: N/A psi gage at N/A °F

N/A d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? ☐ Yes ☐ No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? ☐ yes ☒ No

If yes, identify type (EPA hazardous waste number) -----

f) Indicate the year (or 12-month period) for item (g): 1-1-94 to 12-31-94

g) Annual throughput of material: 2,500,000 gallons.

Completed by Kip Klee Date 09-16-93

4793

Storage Tank Emission Report
Monday, September 13, 1993

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- (6) Maximum emissions are five times the calculated annual emissions.

---- Tank Characteristics ----

Identification

Identification No.:	T034	City:	Dayton
State:	Ohio	Company:	DOE-FEMP

Input Parameters

Type of Tank: Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	15	Diameter (ft):	13
Liquid Height (ft):	15	Volume (gallons):	14895
Turnovers:	168	Net Throughput (gal/yr):	2500000

Roof Characteristics

Roof Type:	Cone	Roof Height (ft):	0.000
Slope (ft/ft):	0.00000	Dome Radius (ft):	0.00

Paint Characteristics

Shell Color/Shade:	Aluminum/Specular	Shell Condition:	Good
Roof Color/Shade:	Aluminum/Specular	Roof Condition:	Good

Breather Vent Settings

Vacuum Setting(psig):	0.00	Pressure Setting(psig):	0.00
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---- Storage Tank Contents Temperature Data ----

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Vented Vapor Saturation Factor =	1.000000
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Maximum Emissions: $5.05 \text{ E-07 lb U/year} \times 5 = 2.52 \text{ E-06 lb U/year}$